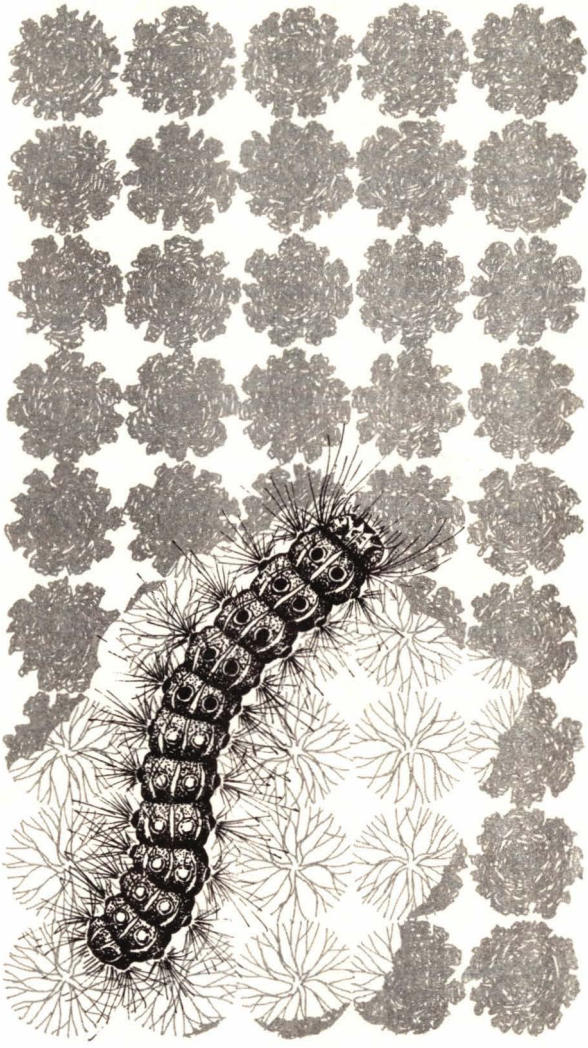
SD
11
.U573
no. 25

United States Department of Agriculture
Forest Service
Northeastern Area
NA-FB/P-25

Guides for Predicting Gypsy Moth Damage

for Forest Landowners



If you are like most forest owners trying to cope with the gypsy moth there are some things you want to know, such as: How much defoliation can I expect? How much of my forest will die? Which trees are most vulnerable? and, How will it affect the value of my timber?

Here are some handy guides to help you answer these questions. All that you or your local forester have to do is collect some easy-to-gather information about such things as tree species composition, crown conditions, and gypsy moth egg masses. The guides were developed with data collected from infested plots in Pennsylvania. The guides aren't perfect and by no means account for all the variation in damage caused by gypsy moth. But they will give you a good idea of what to expect.

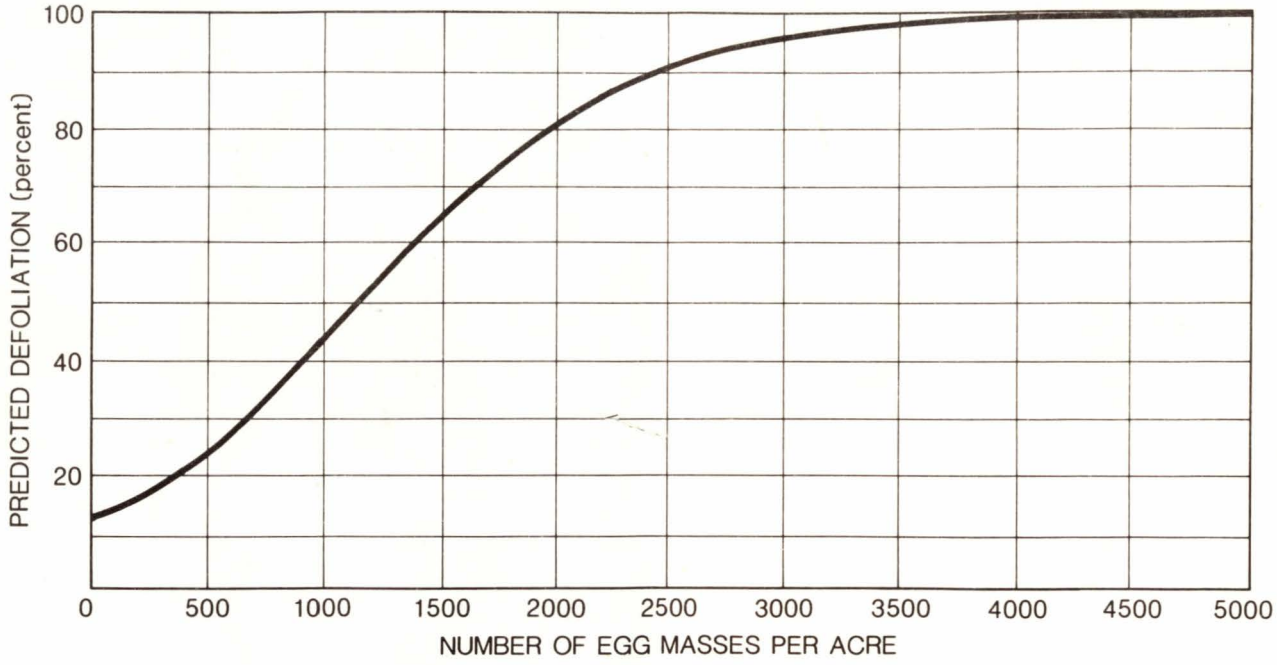
These guides are results of a continuing effort to improve techniques for monitoring and predicting damage as the pest becomes established in new territories. Your State Forester and the USDA Forest Service are cooperating in this venture.

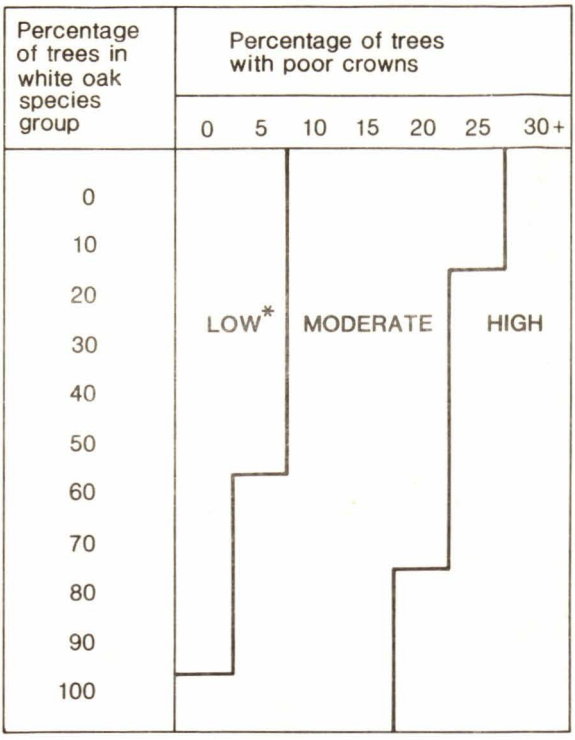
How Much Defoliation

Anytime after the leaves drop in the fall, visit your woodlot. Determine the number of new (current year) egg masses per acre. New egg masses are brightly colored and firm to the touch. Old egg masses are faded and spongy. A 1/40-acre circular plot (radius = 18.6 feet) works well. Count all the new gypsy moth egg masses you see on trees, stumps, down logs, or other objects on the plot. This figure multiplied by 40 gives an estimate of the number of egg masses per acre. Take as many plots as you think you'll need to get a representative sample. Then use this graph to determine the amount of foliage that will be eaten next summer.

Stand Mortality

Determine what percentage of the trees in your woods have "poor" crowns. A poor crown has more than 50% dead branches; very thin foliage; poor color; or heavy sprouting.





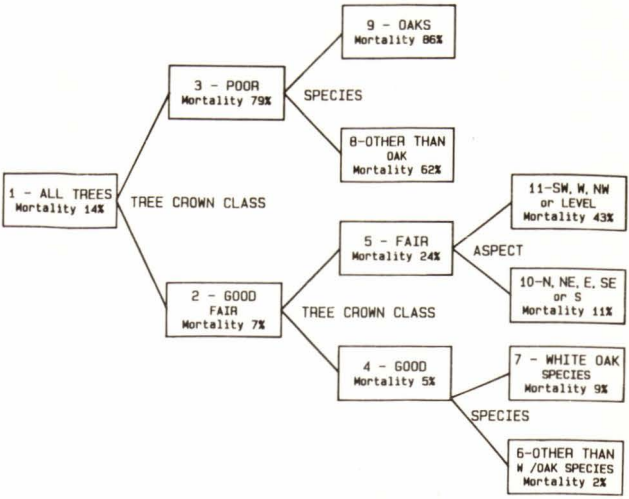
*Low Hazard = less than 10% mortality
Moderate hazard = 10-25% mortality
High hazard = more than 25% mortality

Next, determine what percentage of the trees in your stand are in the white oak species group. White oaks have rounded leaf margins while red oaks have pointed leaf margins.

Then use this chart to predict the potential hazard of a gypsy moth attack in terms of stand mortality.

Individual Tree Mortality

The risk of an individual tree dying in an infested stand varies greatly. You can use the decision guide below, with information on tree species, crown condition, and site aspect (direction of the slope of the land) to assign mortality probabilities ranging from 2 to 86 percent. For all trees that go through an outbreak, the probability of dying is about 14 percent (Box 1). If a tree has a poor crown, the probability increases to 79 percent (Box 3). If a tree with a poor



crown is an oak, the probability increases to 86 percent (Box 9). Trees with good crowns usually don't die. Even white oak species with good crowns stand less than a 10 percent chance of dying during an outbreak (Box 7). A good crown is healthy with few dead branches and has normal foliage density, color, and size. A fair crown has less than 50 percent dead branches and has subnormal foliage density, size and color, with some branch sprouting.

Change in Timber Value

The gypsy moth can affect the value of your timber. The annual rate of value change in **uninfested** forests normally averages about +3 or +4 percent. But, in **infested** woodlots, the rate of change averages only +1 percent. You can estimate the rate of change in timber value for your infested stand with this formula:

$$R = 1.143 + 0.065\,(BA) + 0.082\,(PBA) - 0.107\,(PBP)$$

WHERE:

R = Rate of change in timber value (compound interest in percent).

BA = Basal area* (sq. ft./acre) in tree species the gypsy moth avoids such as yellow poplar, black locust, ash, and sycamore.

*Basal area is the area of the cross section of a tree measured at 4½ feet above the ground.

PBA = Percent of stand basal area in trees 3.0 to 4.9 inches in diameter.

PBP = Percent of stand basal area in trees with poor crowns.

Here are a couple of typical examples:

	Stand 1	*Stand 2*
Basal area (sq. ft./acre) in species avoided by the moth	0	35
Percent of stand basal area in trees 3.0 to 4.9 inches in diameter	10	25
Percent of stand basal area in trees with poor crowns	65	5
Rate of value change =	−5%	+5%

For a timber stand worth $2,000, a 5 percent change would amount to about $100/year.

Summary

Armed with estimates of potential defoliation, predictions of individual tree and stand mortality, and a feeling for expected changes in timber stand values, you'll be better informed to make decisions about gypsy moth management on your land.

For more information about what the gypsy moth can do to your forest and how you can cope with this pest, contact your State Forester or:

Northeastern Area State & Private Forestry
Louis C. Wyman Forestry Science Laboratory
P.O. Box 640
Durham, New Hampshire 03824
Telephone: 603-868-5719, 5936

Northeastern Area State & Private Forestry
USDA—Forest Service
180 Canfield Street
Morgantown, West Virginia 26505
Telephone: 304-291-4133

Northeastern Area State & Private Forestry
USDA—Forest Service
1992 Folwell Avenue
St. Paul, Minnesota 55108
Telephone: 612-642-5324

Based on research information supplied by the Northeastern Forest Experiment Station, 370 Reed Road, Broomall, PA 19008